

REMARKS

In the Office Action dated October 26, 2007, claims 1, 3-8, 10, 12-14, 17, 18, and 26-31 were rejected under 35 U.S.C. § 103 over U.S. Patent No. 5,686,349 (Nakata '349) in view of Constant et al., "Thin Film Transistors Based on Microcrystalline Silicon on Polyimide Substrates" (Constant).

It is respectfully submitted that the obviousness rejection against the claims is erroneous.

To make a determination under 35 U.S.C. § 103, several basic factual inquiries must be performed, including determining the scope and content of the prior art, and ascertaining the differences between the prior art and the claims at issue. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 U.S.P.Q. 459 (1965). Moreover, as the U.S. Supreme Court held, it is **important** to identify a reason that would have prompted a person of ordinary skill in the art to combine reference teachings in the manner that the claimed invention does. *KSR International Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1741, 82 U.S.P.Q.2d 1385 (2007).

With respect to independent claim 26, the Office Action conceded that Nakata '349 fails to disclose supplying SiH₄ and H₂ during the first process in which SiH₄ is supplied at a first rate and H₂ is supplied at a second rate, where the first rate and second rate define a flow rate ratio that prevents a thin film formed on the substrate from becoming amorphous. 10/26/2007 Office Action at 4. However, the Office Action relied upon Constant as purportedly disclosing the subject matter missing from Nakata '349. *Id.*

The Office relied upon Example 1 of Nakata '349 as purportedly disclosing certain elements of the claim. In the Example 1 embodiment of Nakata '349, deposition of an **amorphous** silicon layer on the substrate occurs during the first time period in which the material gas (SiH₄) and hydrogen gas are introduced. Nakata '349, 5:45-58. On the other hand, during the period in which only the hydrogen gas is introduced, the **amorphous** silicon layer that **has been deposited** on the substrate 10 is subjected to a hydrogen plasma treatment to **convert** the deposited amorphous silicon layer into a microcrystalline layer. Nakata '349, 5:58-61; 6:26-28; 7:18-20.

The Office Action did not dispute this explicit teaching of Nakata '349. In fact, the Office Action even conceded that any residual silane (SiH₄) during the second process of Nakata '349 would be **deposited** as amorphous. 10/26/2007 Office Action at 4. However, the Office

Action continued to take the apparently contradictory position that converting the already deposited amorphous silicon in Nakata '349 into the microcrystalline layer constitutes depositing a portion of the microcrystalline thin film during the second process, as recited in claim 26.

In making this assertion, the Office Action effectively has ignored the specific claim language. The undisputed fact is that Nakata '349 teaches depositing a portion of an amorphous silicon layer, and not a portion of a microcrystalline thin film. The approach taught by Nakata '349 completely contradicts the subject matter of claim 26.

Nakata '349 teaches a two-step process that involves first depositing an amorphous silicon layer, followed by converting, using a hydrogen plasma treatment, the amorphous silicon layer into a microcrystalline layer. In other words, Nakata '349 teaches a technique that involves formation of an amorphous silicon layer, contrary to the claimed subject matter.

As a result, a person skilled in the art clearly would not have been prompted to combine the teachings of Nakata '349 and Constant. What the Office Action appears to suggest is that this person skilled in the art would have been led to replace the hydrogen plasma treatment step of Nakata '349 with the Fig. 3 process of Constant in which adjustment of SiH_4 and H_2 would lead to depositing a microcrystalline thin film. However, performing such replacement would make no sense, since Nakata '349 teaches first depositing an amorphous silicon layer—the Fig. 3 process of Constant in the context of Nakata '349 would clearly make no technical sense. This is a strong indication that a person skilled in the art would have found no reason to combine the teachings of Constant with Nakata '349. *See KSR*, 127 S. Ct. at 1741 (holding that it is **important** to identify a reason that would have prompted a person of ordinary skill in the art to combine reference teachings in the manner that the claimed invention does).

Alternatively, if the Office Action is suggesting that step 1 of Nakata '349 be replaced with the Fig. 3 process of depositing a microcrystalline thin film, then the hydrogen plasma treatment step (step 2) of Nakata '349 would have been rendered completely useless and unnecessary. Such a proposed modification would completely alter the principle of operation of Nakata '349, and is thus a strong indication that the claimed subject matter is non-obvious over Nakata '349 and Constant.

The Office Action further made the erroneous assertion that the “claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results” 10/26/2007 Office Action at 4-5. As established above, this statement is clearly erroneous.

The first modification of Nakata ‘349, in which the hydrogen plasma treatment step of Nakata ‘349 with the Constant process, would have made no technical sense, since amorphous silicon has already been deposited in the first step of Nakata ‘349. The second modification of Nakata ‘349, in which the first step of Nakata ‘349 was replaced with the Constant process, would have rendered the second step of Nakata ‘349 superfluous and completely unnecessary, which would have significantly changed the principle of operation of Nakata ‘349.

In view of the foregoing, it is clear that the obviousness rejection of claim 26 over Nakata ‘349 and Constant is clearly erroneous.


It is respectfully submitted that independent claims 1, 28, 29, and 31 are also non-obvious over Nakata ‘349 and Constant, since no reason existed that would have prompted a person of ordinary skill in the art to combine the teachings of Nakata ‘349 and Constant.

Dependent claims are allowable for at least the same reasons as corresponding independent claims.

Allowance of all claims is respectfully requested. The Commissioner is authorized to charge any additional fees and/or credit any overpayment to Deposit Account No. 20-1504 (CMO.0012US).

Respectfully submitted,

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